Brief description of the drawings

Fig. 1 shows a linear bearing of the invention, partly in cross-section and partly in a front view;

Fig. 2 shows a guide carriage of the linear bearing in cross-section, with a grinding wheel in contact with the surfaces to be ground.

Detailed description of the drawings

The linear rolling bearing illustrated in Fig. 1 comprises a guide carriage 1 that is supported through balls 3 on a guide rail 2 and is displaceable in the longitudinal direction of the rail. The linear rolling bearing is configured with two guide members 4 as a four-row bearing. Each guide member 4 contains two canals that effect the deflection and return of the balls 3 that are arranged in endless circuits. The guide carriage 1 has a U-shaped configuration and comprises a U-crossbar 5 and two U-legs 6 continuing therefrom. In this way, the guide carriage 1 forms a carriage cavity 7 and partially surrounds the guide rail 2 so that this projects into the carriage cavity 7.

Two raceways for balls 3 are configured on each longitudinal side of the guide rail 2 i.e., on each side of the guide rail 2 there is configured an upper raceway 8 and a lower raceway 9. These raceways 8 and 9 are parallel to each other in the longitudinal direction of the guide rail 2. The guide carriage 1 is supported on these raceways through the balls 3. For this purpose, the guide carriage 1 has on the inner surface of each U-leg 6 adjacent the guide rail 2, an upper raceway 10 that is situated nearer the U-crossbar 5 and a lower raceway 11 that is situated further away from the U-crossbar 5.

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The load-bearing balls 3 are arranged on each longitudinal side of the guide rail 2 between each of the raceways 8 and 9 of the guide rail 2 and corresponding

INSERT A

The ground raceway 10 made by grinding has an approximately quarter circle cross section for the balls 3. The ground raceway 10 of each U-leg 6 of the guide carriage 1 is situated nearer the U-crossbar 5, and each U-leg 6 comprises on the inner surface another raceway 11 that is situated further away from the U-crossbar 5 and has an approximately quarter circle cross-section for the balls 3.

raceways 10 and 11 of the guide carriage 1. Two of the four endless circuits of balls 3 are arranged on each longitudinal side of the guide rail 2. Each guide member 4 surrounds one of the U-legs 6 and is retained on a stop surface 12 of this U-leg 6. The stop surface 12 has a retaining contour and is situated on the guide rail-distal outer side of each U-leg 6. Two return canals for the balls i.e., an upper return canal 13 and a lower return canal 14, extending parallel to the raceways 10 and 11 of the U-leg 6 are formed in the guide member 4. At their ends, these canals merge into deflector canals that connect the return canals 13 and 14 to the associated regions of load-bearing balls 3 between the raceways 8 and 10, and between the raceways 9 and 11 respectively. Thus, the upper return canal 13 is connected to the raceway 10, and the lower return canal 14 is connected to the raceway 11.

The return canals 13 and 14 have an inner diameter corresponding to the diameter of the balls 3 and a radial opening 15 that extends in the longitudinal direction of the guide rail 2 and whose width is smaller than the ball diameter. On their longitudinal sides opposite the opening 15, the return canals 13 and 14 comprise a common bottom wall 16 so that the balls 3 are retained in their respective return canals 13 and 14 in the guide member 4 even when the guide member 4 is separated from the guide carriage 1. The guide member 4 can be made as an elastic component out of a plastic or a metal. Between its two raceways 10 and 11 for the load-bearing balls 3, the U-leg 6 comprises a projecting lug 17 that helps in unmistakably fixing and retaining the guide member 4 in the bearing.

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Fig. 2 shows the manner in which the guide carriage 1 is machined with a grinding wheel 18. The axis of rotation 19 of the grinding wheel 18 is situated outside of the guide carriage 1 and is disposed at an acute angle α to the axis of symmetry 20 of the guide carriage 1. This permits a simultaneous grinding both of the raceway 10 situated nearer the U-crossbar 5 and the raceway 11 situated further away from the U-crossbar 5 on the inner surface of one of the U-legs 6 using one part of the grinding wheel 18 and, at the same time, a grinding of the stop surface 12 on the outer surface of the other U-leg 6 using another part of the grinding wheel 18. To

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enable a part of the grinding wheel 18 to be inserted into the carriage cavity 7 and grind the raceways 10 and 11, both the raceways 11 of the guide carriage 1 situated further away from the U-crossbar 6 end at an imaginary connecting plane 21 that extends through the centers of the load-bearing balls 3 circulating on the raceways 11 and limits the two U-legs 6 on their undersides.

INSERT B

Fig. 2 shows the manner in which the guide carriage 1 is machined with a grinding wheel 18. The axis of rotation 19 of the grinding wheel 18 is situated outside of the guide carriage 1 and is disposed at an acute angle (a) to the axis of symmetry 20 of the guide carriage 1.

The acute angle (a) that the axis of rotation 19 of the grinding wheel 18 forms with the axis 20 of symmetry of the guide carriage 1 is about 15°.

This permits a simultaneous grinding both of the raceway 10 situated nearer the U-crossbar 5 and the raceway 11 situated further away from the U-crossbar 5 of the inner surface of one of the U-legs 6 using one part of the grinding wheel 18 and, at the same time, a grinding of the stop surface 12 on the outer surface of the other U-leg 6 using another part of the grinding wheel 18. To enable a part of the grinding wheel 18 to be inserted into the carriage cavity 7 and grind the raceways 10 and 11, both the raceways 11 of the guide carriage 1 situated further away from the U-crossbar 5 end at an imaginary connecting plane 21 that extends through the centers of the load-bearing balls 3 circulating on the raceways 11 and limits the two U-legs 6 on their undersides.